

CLAIMS

What is claimed is:

1. A polishing fluid for a chemical-mechanical polishing process, comprising:

a surfactant having an aliphatic structure;

a buffer for maintaining said polishing fluid at a pH ranging between about 5 and about 14; and

a chelating agent.
2. The polishing fluid according to claim 1, wherein said surfactant is included at a concentration ranging between about 0.01 vol.% and about 10 vol.%
3. The polishing fluid according to claim 1, wherein said surfactant includes one or more compounds selected from the group consisting of poly(acrylic acid) potassium salts, poly(acrylic acid) ammonium salts, anionic fluorinated surfactants, neutral fluorinated surfactants, cationic fluorinated surfactants, amphoteric fluorinated surfactants, polyethylene glycol, lauric acid, stearic acid, alkali stearates, alkali laureates, oleic acid, and alkali oleate.
4. The polishing fluid according to claim 1, wherein said chelating agent includes one or more compounds selected from the group consisting of oxalic acid, ethylenediaminetetraacetic acid tripotassium salt, and potassium oxalate.
5. The polishing fluid according to claim 1, wherein said chelating agent is included at a concentration ranging between about 0.1 wt.% and about 20 wt.%.

6. The polishing fluid according to claim 1, wherein said buffer maintains said polishing fluid at a pH of about 7.

7. A method for making a polishing fluid, comprising the step of:

combining a surfactant having an aliphatic structure, a chelating agent, and a solvent with a buffering agent for maintaining said polishing fluid at a pH ranging between about 5 and about 14.

8. The method according to claim 7, wherein said surfactant is included at a concentration ranging between about 0.1 vol.% and about 10 vol.%

9. The method according to claim 7, wherein said surfactant includes one or more compounds selected from the group consisting of poly(acrylic acid) potassium salts, poly(acrylic acid) ammonium salts, anionic fluorinated surfactants, neutral fluorinated surfactants, cationic fluorinated surfactants, amphoteric fluorinated surfactants, polyethylene glycol, lauric acid, stearic acid, alkali stearates, alkali laureates, oleic acid, and alkali oleate.

10. The method according to claim 7, wherein said chelating agent includes one or more compounds selected from the group consisting of oxalic acid, ethylenediaminetetraacetic acid tripotassium salt, and potassium oxalate.

11. The method according to claim 7, wherein said chelating agent is included at a concentration ranging between about 0.1 wt.% and about 20 wt.%.

12. The method according to claim 7, wherein said buffering agent maintains said polishing fluid at a pH of about 7.

13. A method for polishing a workpiece surface using a chemical-mechanical polishing pad having a polishing surface, comprising the steps of:

introducing a polishing fluid onto said polishing surface, said polishing fluid comprising:

a surfactant having an aliphatic structure,

a buffer for maintaining said polishing fluid at a pH ranging between about 5 and about 14, and

a chelating agent; and

polishing said workpiece surface using said polishing surface and said polishing fluid.

14. The method according to claim 13, wherein said surfactant is included at a concentration ranging between about 0.1 vol.% and about 10 vol.%

15. The method according to claim 13, wherein said surfactant includes one or more compounds selected from the group consisting of poly(acrylic acid) potassium salts, poly(acrylic acid) ammonium salts, anionic fluorinated surfactants, neutral fluorinated surfactants, cationic fluorinated surfactants, amphoteric fluorinated surfactants, polyethylene glycol, lauric acid, stearic acid, alkali stearates, alkali laureates, oleic acid, and alkali oleate.

16. The method according to claim 13, wherein said chelating agent includes one or more compounds selected from the group consisting of oxalic acid, ethylenediaminetetraacetic acid tripotassium salt, and potassium oxalate.

17. The method according to claim 13, wherein said chelating agent is included at a concentration ranging between about 0.1 wt.% and about 20 wt.%.

18. The method according to claim 13, wherein workpiece surface includes trenches having an oxide compound formed therein, and

said polishing step planarizes said workpiece surface, said fluid preventing removal of said oxide below said planarized workpiece surface.

19. An apparatus for performing a chemical-mechanical polishing process on a workpiece surface, comprising:

a fixed abrasive chemical-mechanical polishing pad having a polishing surface;

a workpiece carrier for securing said workpiece surface against said polishing surface during said polishing process;

a polishing fluid container;

a polishing fluid disposed in said container, comprising:

a surfactant having an aliphatic structure,

buffer for maintaining said polishing fluid at a pH ranging between about 5 and about 14, and

a chelating agent; and

a polishing fluid supply channel, in fluid communication with said container, and adapted to supply said polishing fluid to said polishing surface.

20. The apparatus according to claim 19, wherein said surfactant is included at a concentration ranging between about 0.01 vol.% and about 10 vol.%

21. The apparatus according to claim 19, wherein said surfactant includes one or more compounds selected from the group consisting of poly(acrylic acid) potassium salts, poly(acrylic acid) ammonium salts, anionic fluorinated surfactants, neutral fluorinated surfactants, cationic fluorinated surfactants, amphoteric fluorinated surfactants, polyethylene glycol, lauric acid, stearic acid, alkali stearates, alkali laureates, oleic acid, and alkali oleate.

22. The apparatus according to claim 19, wherein said chelating agent includes one or more compounds selected from the group consisting of oxalic acid, ethylenediaminetetraacetic acid tripotassium salt, and potassium oxalate.

23. The apparatus according to claim 19, wherein said chelating agent is included at a concentration ranging between about 0.1 wt.% and about 20 wt.%.

24. The apparatus according to claim 19, wherein said buffer maintains said polishing fluid at a pH of about 7.

25. The apparatus according to claim 19, wherein said polishing pad comprises a substantially uniform mixture of a friable filler material, an abrasive, and a resinous binder, and is constructed to continually wear during polishing and thereby facilitate continuous exposure of the abrasive.